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FOCUSED SEABIRD COLONY SEARCHES OF PU`UHONUA O HŌNAUNAU NATIONAL HISTORICAL PARK

Inventory and Monitoring Program
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NPS	National Park Service
PACN	Pacific Island Network
I&M	Inventory & Monitoring Program
HAVO	Hawai`i Volcanoes National Park
PUHO	Pu`uhonua o Hōnaunau National Historical Park

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ABSTRACT

The objective of this inventory was to determine whether seabird species are nesting in Pu`uhonua o Hōnaunau National Historical Park (PUHO). The surveys focused on the cliffs above Alahaka and Kiilae bays located in the southern half of the park, and Keanae`e Cliffs located in the center of the park One morning survey and one evening survey were conducted weekly for eight consecutive weeks. The surveys also provided the opportunity to possibly detect band-rumped storm-petrels (*Oceanodroma castro*) as they fly to suspected nesting areas at higher elevations of the western flank of Mauna Loa, outside of PUHO Park boundaries. Ten great frigatebirds (*Fregata minor*) were observed during the 27th July sunset survey. No other seabirds were detected during the study.

INTRODUCTION

Pu`uhonua o Hōnaunau National Historical Park (PUHO) is a cultural preserve consisting of 74 ha along the coast in the south Kona district on the island of Hawai`i. The park is in the process of acquiring an additional 96 ha of land to the south and east of the existing park boundaries in an area known as Kiilae (Figure 1). Like PUHO, Kiilae consists mostly of non-native shrubland and rocky shoreline.

Two previous avian inventories of PUHO did not detect the presence of any seabird species within park boundaries (Morin 1996; Waddington 2004). It is known that seabirds, specifically white-tailed tropicbirds (*Phaethon lepturus*), roost and most likely nest at the cliffs approximately 6.5 km to the north of the park and cliffs approximately 6.0 km to the south of the park (Waddington 1999, unpublished data). A fisherman at the park reported observing white-tailed tropicbirds on five or six occasions beginning in April 2005 and ending in early May 2005. All observations took place at sunset and involved a pair of tropicbirds circling the Kiilae bay. On two of the occasions the pair landed on rock outcroppings of the cliffs above the bay. The fisherman did not note the direction from which the pair came from or departed to. A focused seabird study provided the opportunity to identify potential roosting and nesting sites within the park. The study also provided the opportunity to document and identify seabird species utilizing habitat within park boundaries and to possibly detect band-rumped storm petrels (*Oceanodroma castro*) as they fly to suspected nesting areas at higher elevations of the western flank of Mauna Loa, outside of PUHO Park boundaries.

METHODS

Two initial daytime surveys were conducted to identify potential roosting and nesting sites, and to identify the most appropriate observation points from which to conduct the surveys. The surveys focused on the cliffs above Alahaka and Kiilae bays located in the southern half of the park, and Keanae`e Cliffs located in the center of the park (Figure 1).

Noting the cultural significance and sensitivity of the park, the surveys we coordinated with park law-enforcement personnel and the park resources manager to ensure that the surveys were conducted in a respectful and appropriate manner. The two initial surveys focused on signs of bird activity such as guano, feathers, and nests.

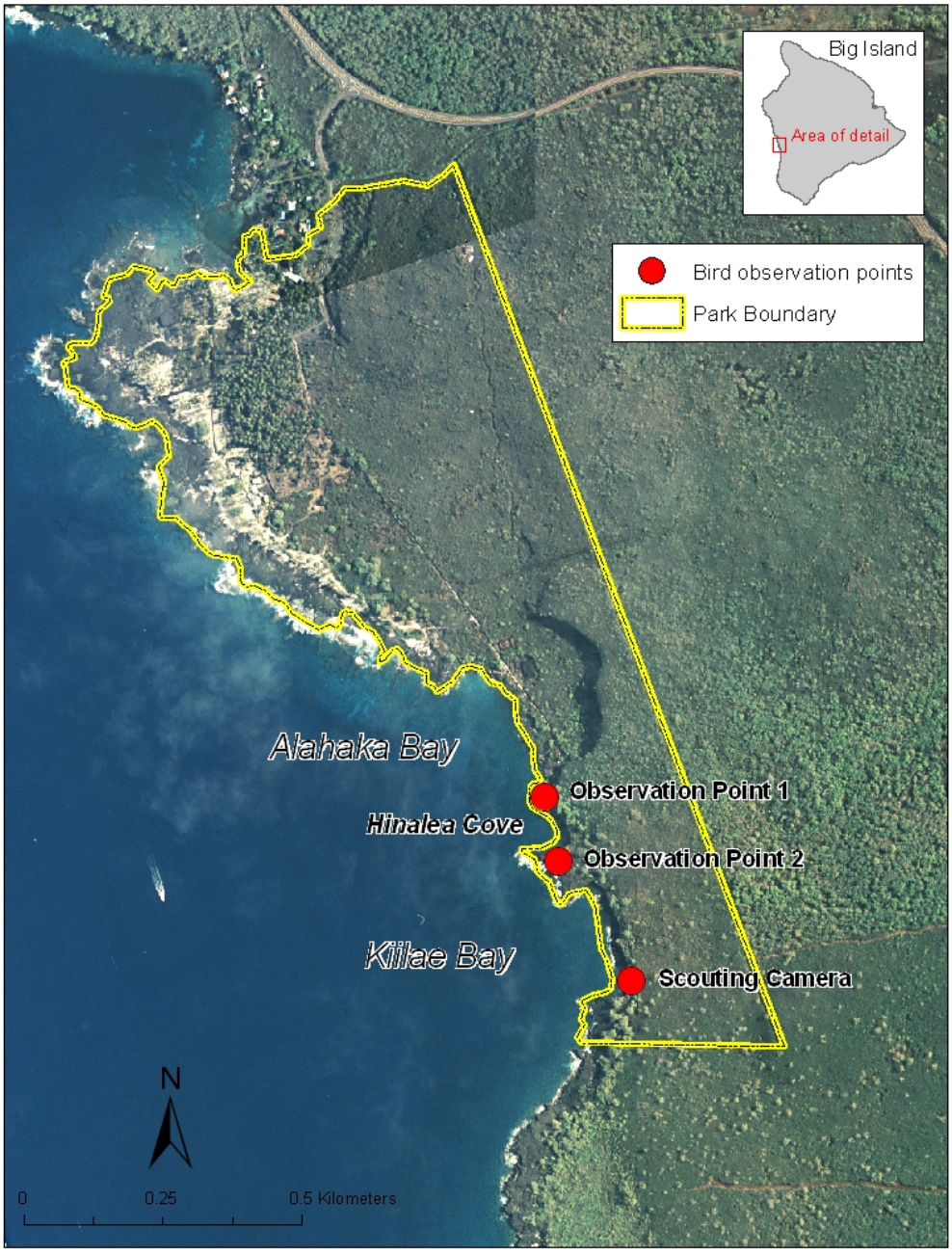

Figure 1. Map of Pu`uhonua o Hōnaunau seabird observation points and scouting camera location

After the initial surveys, two observation points were established from which two weekly surveys were conducted. Bi-weekly surveys began June 8th, 2005 and concluded July 28th, 2005. One morning survey (approximately 0400-0800) and one evening survey (approximately 1600-2000 were conducted weekly for eight consecutive weeks. The surveys consisted of hiking out to one of the two established observation points and looking and listening for any seabird activity. The following equipment was used during the study: Zeiss 10 x 40 Victory Binoculars, Nikon Fieldscope ED II 20-56 x 82, ITT PVS-14 Generation III Night Vision monocular, Canon D30 digital camera with Canon 100-400 mm image stabilized lens, JVC GR-DV7 digital video recorder, Kestrel 3000 pocket weather station, Garmin Etrex Vista GPS, Dan Gibson parabolic microphone, and a Bushnell Trailscout 2.1 megapixel digital scouting camera.

Law-enforcement personnel at PUHO was notified one day prior to each survey. Hawaii Volcanoes National Park (HAVO) dispatch was contacted by either cell phone or radio at the beginning of each survey, and was informed of the survey location, start time and expected end time of the survey. At the conclusion of each survey HAVO dispatch was again contacted.

The use of Bushnell scouting camera was an attempt to determine their effectiveness as a research tool for the detection of seabirds at the park (Figure 2). The camera was set up at a cave entrance in the cliffs above Kiilae bay (Figure 1) and programmed to operate 24 hours a day. The location was selected because of guano deposits and eggshell fragments located nearby on the cliffs and its relative inaccessibility which provided security for the equipment. Due to the dangerous terrain, the scouting camera was checked only during adequate light conditions, at the beginning of each evening survey and at the end of each morning survey. A passive infrared sensor with a specified detection range of 30 m activates the camera. The camera utilizes infrared LEDs for nighttime illumination so as not to disturb the target animal.

Figure 2. Bushnell scouting camera

RESULTS AND DISCUSSION

The first survey was conducted on the 25th of May at the Keanae`e cliffs. Due to the high cultural sensitivity of this area, the survey was coordinated and conducted with park law enforcement and resource management personnel. The survey consisted of walking at the base of the cliff's entire length (approximately 2 km) looking for bird activity or signs. There were numerous areas of large guano deposits as well as owl pellets and rodent skeletal remains (Figure 3). Two barn owls (*Tyto alba*) were observed at the southern end of the cliffs.

Figure 3. Photo of guano and owl pellets below Keanae`e cliffs

The second survey occurred on June 2nd and focused on the cliffs above Alahaka and Kiilae bays. There were small unidentifiable eggshell fragments located at a cave entrance on the southern side of the Kiilae cliffs (Figure 4). The area above the Keanae`e cliff was also surveyed. Approximately one-half of the northern upper cliff area was surveyed for signs of bird activity and a potential observation point for the morning and evening surveys. No additional signs of bird activity were detected in this area and due to the difficult access and cultural sensitivity of the area, no observation points were selected on top of these cliffs.

Figure 4. Eggshell fragments in Kiilae cliffs

Ten great frigatebirds (*Fregata minor*) were observed during the July 27th sunset survey at 1830. The great frigatebirds were circling above the visitor center at an estimated altitude of 300-400 m and moved slowly to the north. This sighting accounted for the only observation of any seabirds during this study.

I detected no other seabirds during the study. The close proximity of the observation points to the shore made conditions for listening less than ideal. Wind, rain, and tidal action inhibited the ability to detect seabirds by sound. The use of a parabolic dish and amplified microphone was not able to overcome these conditions.

I suspect that the pair (or pairs) of white-tailed tropicbirds observed by the fisherman in April and May was likely utilizing more suitable habitat outside of the park boundaries. White-tailed tropicbirds are known to be mostly solitary with the exception of the breeding and nesting season. The fisherman's observations of a pair may indicate that the birds were engaged in pair bonding or courtship behaviors with the peak-nesting season for the species occurring from March through October.

Endangered Hawaiian bats (*Lasiurus cinereus semotus*) were observed on June 22nd and July 18th. Two bats were observed each sighting. The bats were flying over Kiilae bay on both occasions. These data were communicated to the I&M bat researchers who were conducting a study at the same time.

Of the three cliff areas in the park, the Keanae`e cliffs offer the most suitable habitat for some species of nesting seabirds. Barn owls have similar nesting requirements and have established themselves at the Keanae`e cliffs as well as the park. Barn owls were detected every sunset/sunrise survey at the Keanae`e cliff area. Park personnel reported that the barn owls have been observed in this area for a number of years and have

successfully nested in the cliffs. Barn owls are known to predate seabirds and the owls' presence may deter seabirds from utilizing the cliffs and possibly other areas within the park. Barn owls were also observed at Alahaka and Kiilae bays and observed roosting on the cliffs above each of the bays during this survey.

In addition to barn owls, feral cats (*Felis catus*), small Indian mongoose (*Herpestes auropunctatus*) and rats (*Rattus* spp) are a serious threat to any nesting birds. Feral cats were observed in the picnic and administration area and undoubtedly are found throughout the park. Mongooses were observed throughout the park, including in a cave above Kiilae bay (Figure 5). Park staff has observed signs of mongoose in the caves of Keanae`e cliffs.

Figure 5. Mongoose in Kiilae cliffs. Photo taken with scouting camera

Three sets of rat remains (two partial, one whole) were observed on the rocks below the Kiilae cliff area. The remains were in poor condition, but confirmed the presence of rats in the area.

RECOMMENDATIONS

Monitoring procedures to allow park staff to document the observations of any rare, unusual, and perhaps previously undocumented species should be developed and implemented.

If this study is repeated, a change in the seasonal time-frame should be considered. Judging by the dates when observations were made by the fisherman this year, beginning the surveys in February or March may result in more seabird observations.

If further work is attempted to determine whether band-rumped storm petrels are flying over PUHO to potential nesting sites on the western flanks of Mauna Loa, possibly within HAVO boundaries, an array of automated sound recorders could be deployed above the Keanae`e cliff toward the park's eastern boundary. This location is high above the interference of the tidal action and far enough away from Highway 160 to provide good detection and recording conditions.

The use of the scouting camera did not result in any pictures of birds. However, it confirmed the presence of mongoose in the cliffs above Kiilae bay. The camera did detect activity on several other occasions at night and took pictures, but did not capture any images. It is possible that these were false detections or that the infrared illumination did not have the range or was to slow to illuminate the activity. The greatest challenge was finding a secure location for the camera. The camera is small and prone to theft with no way of securing it to the rocky cliffs. Additional study and work with such cameras may prove beneficial on other research projects.

A more detailed study of the barn owl pellets observed below the Keanae`e cliffs may determine whether the owls are preying on seabirds or, more importantly, on endangered Hawaiian hoary bats that have been found to frequent the park. Park staff has indicated that there is another collection of owl pellets in one of the caves that is apparently no longer utilized by the owls. Examination of this collection could provide additional data about the diet of the barn owls.

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